R E M A R K S

Reconsideration of the present application, as amended, is respectfully requested.

The April 19, 2002 Office Action and the Examiner's comments have been carefully considered. In response, the drawings and claims are amended, a Terminal Disclaimer is submitted, and remarks are set forth below in a sincere effort to place the present application in form for allowance. The amendments are supported by the application as originally filed. Therefore, no new matter is added.

DRAWINGS

In the Office Action Fig. 1 is objected to as not including the legend "Prior Art", and "Figs. 4B and 6B are objected to because of a misspelling. In response, Fig. 1 is amended to include the legend "PRIOR ART", and the word "FULORESCENT" has been changed to --FLUORESCENT-- in Figs. 4B and 6B. Submitted concomitantly herewith is a Letter to the Official Draftsperson requesting approval of the proposed drawing changes to Figs. 1, 4B and 6B. New formal drawings will be submitted in due course.

CLAIM OBJECTIONS

In the Office Action claims 7 and 11 are objected to because of informalities. Specifically, the Examiner indicates that the

word "detects" should be changed to --excites--. In response, claims 7 and 11 are amended to change the word "detects" to --excites--. In view of the amendment of claims 7 and 11, reconsideration and withdrawal of the objection to claims 7 and 11 are respectfully requested.

REJECTION UNDER 35 USC 112

In the Office Action claim 13 is rejected under the second paragraph of 35 USC 112 because the Examiner states that the limitation of "an external input circuit outputs a signal to the microscope" is indefinite because it is unclear whether the "external input circuit" is an element of the microscope. The Examiner also states that the claim is incomplete for omitting essential structural cooperative relationships of elements. In response, applicant respectfully states that the external input circuit (indicated by reference numeral 39 in Figs. 2, 3 and 5) is not a structural element of the microscope. In order to clarify this fact, claim 13 is amended to recite that the external input circuit is operatively electrically coupled to the microscope and provides a signal to the microscope.

In view of the foregoing explanation regarding the external input circuit and the amendment of claim 13, reconsideration and withdrawal of the rejection of claim 13 under the second paragraph of 35 USC 112 are respectfully requested.

DOUBLE PATENTING REJECTION

In the Office Action claims 1-15 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-13 of copending Application No. 09/652,500. In response, submitted herewith is a Terminal Disclaimer effectively disclaiming the terminal part of the term of any patent granted on the present application which extends beyond the patent term of a commonly owned issued patent, to be granted on co-pending application Serial No. 09/652,500. In view of the submission of the Terminal Disclaimer, reconsideration and withdrawal of the provisional rejection of claims 1-15 under the judicially created doctrine of obviousness-type double patenting are respectfully requested.

CLAIM AMENDMENTS

Claims 1, 8 and 12 are amended to recite "a scanning mirror". This amendment is made to more clearly define the claimed invention and is not related to the patentability of the claims.

REJECTION UNDER 35 USC 103

In the Office Action claims 1-5, 7-9 and 11-14 are rejected under 35 USC 103 as being unpatentable over USP 6,025,917 (Toyonaga et al) in view of USP 5,866,911 (Baer). Claims 6, 10

and 15 are rejected under 35 USC 103 as being unpatentable over Toyonaga et al in view of Baer, and further in view of USP 5,523,573 (Hänninen et al).

The present claimed invention as defined by amended claim 1 is directed to a laser scanning microscope which includes a pulse laser oscillator configured to oscillate a pulse laser beam to excite a sample, a scanning mirror configured to scan the pulse laser beam, a photodetector configured to detect light from the sample and output an electric signal, a sampling circuit configured to sample the electric signal output from the photodetector in synchronism with the oscillation of the pulse laser beam output from the pulse laser oscillator, and a memory configured to accumulate data output from the sampling circuit.

In rejecting claim 1, the Examiner states that Toyonaga et al do not explicitly show a memory but Baer shows a memory at column 4, lines 31-39.

Toyonaga et al is directed to a TV microscope, not a scanning microscope as defined by the claims. A TV microscope is entirely different than a scanning microscope. A TV microscope does not employ a memory, such as that shown in Baer or the present application, and there is no need for such a memory. There is no motivation, teaching or suggestion to combine Toyonaga et al and the memory in Baer because it is inherent in TV microscopes such as in Toyonaga et al that a memory is not

utilized. A scanning microscope (such as Baer and the present invention) visualizes an image by sequentially storing data on the light amounts corresponding to addresses. In contrast, the TV microscope of Toyonaga et al forms secondary images by use of an image intensifier and therefore does not have to accumulate data corresponding to addresses and therefore does not use a memory. A person of ordinary skill in the art at the time the invention was made would not have combined the memory of Baer with the TV microscope of Toyonaga et al since Toyonaga et al have no need for the memory.

In view of the foregoing, claim 1 is patentable over Toyonaga et al and Baer, taken either singly under 35 USC 102 or in combination under 35 USC 103.

Claims 8 and 12 are also directed to a laser scanning microscope and recite the memory set forth in claim 1. Claims 8 and 12 are patentable over Toyonaga et al and Baer for reasons, inter alia, set forth above in connection with claim 1.

In rejecting claim 2, the Examiner states that the gate controller (15) described at column 15, lines 35-44 and shown in FIG. 10 of Toyonaga et al is equivalent to the synchronous signal generating circuit recited in claim 2.

The gate controller of Toyonaga et al may be similar to the synchronous signal generating circuit of claim 2 in that both control detection timings. However, the synchronous signal

generating circuit of claim 2 detects oscillation of a laser beam and outputs a synchronous signal on the basis of the detection as recited in claim 2 (see claim 2, lines 3-6). Toyonaga et al merely describes "at the timing when the pulse excitation light is radiated."

Therefore, the gate controller of Toyonaga et al does not render obvious the claimed laser scanning microscope including the synchronous signal generating circuit recited in claim 2. Claim 2 is patentable over the cited references for the foregoing reasons, and in view of its dependence on claim 1.

In rejecting claim 3, the Examiner states that the gate controller described at column 15, lines 35-44 of Toyonaga et al inherently has a delay circuit.

In response, applicants respectfully state that the delay circuit of the present claimed invention defines the time between the laser oscillation and the start of detection (sampling). In contrast, Toyonaga et al define the period of time between the laser oscillation and the end of detection as ΔT. In other words, the present claimed invention determines how long the start of detection should be delayed from the laser oscillation, while Toyonaga et al perform detection simultaneously with the laser oscillation (i.e., at time tO) and determines the time (tO) when the detection should be ended.

Therefore, the gate controller disclosed in Toyonaga et al does not render obvious the claimed laser scanning microscope including the delay circuit defined by claim 3. Claim 3 is patentable over the cited references for the foregoing reasons and in view of its dependence on claim 1.

In rejecting claim 5, the Examiner states that it is obvious to provide a fixed delay in the laser scanning microscope of Toyonaga et al.

Although Baer discloses "the output of detector 23 can be gated to be unresponsive during the time such direct scattered light from the quenching laser is falling on it", this is not equivalent to the fixed delay recited in claim 5.

Claim 5 is patentable over the cited references for the foregoing reason and in view of its dependence on claim 1.

In rejecting claim 6, the Examiner states that variably setting a delay amount is described at column 7, lines 44-46 of Hänninen. Although Hänninen may disclose what is pointed out by the Examiner, it does not explicitly describe delaying a signal. Therefore, there is no disclosure, teaching or suggestion for means for changing a delay set by the delay circuit as recited in claim 6. Claim 6 is patentable over the cited references for the foregoing reasons and in view of its dependence on claim 1.

Claims 4, 7, 9-11 and 13-15 which are ultimately dependent on independent claims 1, 8 and 12 are patentable in view of their

dependence on either claim 1, 8 or 12 or any of the intervening claims.

In view of the foregoing, claims 1-15 are patentable over the cited references under 35 USC 102 as well as 35 USC 103.

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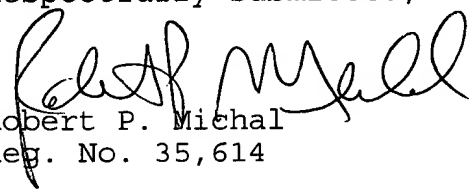
If the Examiner disagrees with any of the foregoing, the Examiner is respectfully requested to point out where there is support for a contrary view.

Entry of the amendment, allowance of the claims, and the passing of the application to issue are respectfully solicited.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

Respectfully submitted,



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Encs.: (1) PETITION FOR EXTENSION OF TIME
(2) TERMINAL DISCLAIMER
(3) LETTER TO THE OFFICIAL DRAFTSPERSON

COPY OF AMENDED CLAIMS SHOWING CHANGES BEING MADE THERETO
SERIAL NO. 09/746,713

1. (Amended) A laser scanning microscope comprising:

a pulse laser oscillator configured to oscillate a pulse laser beam to excite a sample;

a scanning mirror configured to scan the pulse laser beam;

a photodetector configured to detect light from the sample and output an electric signal;

a sampling circuit configured to sample the electric signal output from the photodetector in synchronism with the oscillation of the pulse laser beam output from the pulse laser oscillator; and

a memory configured to accumulate data output from the sampling circuit.

3. (Amended) The laser scanning microscope according to claim 2, wherein the synchronous signal generating circuit has a delay circuit configured to output a trigger signal obtained by delaying the synchronous signal, and the sampling circuit [samples] starts to sample the electric signal from the photodetector in synchronism with the synchronous signal delayed by the delay circuit.

4. (Amended) The laser scanning microscope according to claim 3, further comprising a pulse generator configured to generate a pulse signal for starting oscillation and finishing

the oscillation in a time period shorter than each interval at which the pulse laser beam is oscillated in synchronism with the synchronous signal delayed by the delay circuit, and wherein the sampling circuit samples the electric signal from the photodetector in response to the pulse signal generated by the pulse generator.

7. (Amended) The laser scanning microscope according to claim 1, wherein the pulse laser oscillator is a mode locked ultra fast pulse laser which [detects] excites fluorescence from the sample due to multiphoton excitation.

8. (Amended) A laser scanning microscope comprising: a pulse laser oscillator configured to oscillate a pulse laser beam to excite a sample;

a scanning mirror configured to scan the pulse laser beam;

a photodetector configured to detect light from the sample and output an electric signal;

a laser oscillation synchronous signal generating circuit configured to receive a laser oscillation signal from the pulse laser oscillator and generate a laser oscillation synchronous signal;

a delay circuit configured to delay the laser oscillation synchronous signal output from the laser oscillation synchronous

signal generating circuit, and configured to output the delayed signal as a trigger signal;

a sampling circuit configured to sample the electric signal output from the photodetector in synchronism with oscillation of the trigger signal output from the delay circuit; and

a memory configured to accumulate data [outputted from] output by the sampling circuit.

11. (Amended) The laser scanning microscope according to claim 8, wherein the pulse laser oscillator is a mode locked ultra fast pulse laser which [detects] excites fluorescence from the sample due to multiphoton excitation.

12. (Amended) A laser scanning microscope comprising:

a pulse laser oscillator configured to oscillate a pulse laser beam to excite a sample;

a scanning mirror configured to scan the pulse laser beam;

a photodetector configured to detect light from the sample and output an electric signal;

a laser oscillation synchronous signal generating circuit configured to receive a laser oscillation signal from the pulse laser oscillator and generate a laser oscillation synchronous signal;

a delay circuit configured to delay the laser oscillation synchronous signal output from the laser oscillation synchronous signal generating circuit, and configured to output the delayed signal as a trigger signal;

a pulse generator configured to generate a pulse signal in synchronism with the trigger signal output from the delay circuit;

a sampling circuit configured to sample the electric signal output from the photodetector in synchronism with the pulse signal output from the pulse generator; and

a memory configured to accumulate data [outputted from] output by the sampling circuit.

13. (Amended) The laser scanning microscope according to claim 12, wherein the pulse generator outputs the pulse signal during an output period in which an external input circuit, which is operatively electrically coupled to the microscope, provides [outputs] a signal to the microscope, and the sampling circuit samples, during the output period, the electric signal output from the photodetector.